

# HISTORIC PROPERTY INVENTORY FORM

## IDENTIFICATION SECTION

**Field Site No.** 2736-Z **OAHP No.** \_\_\_\_\_ **Date Recorded** 18 Sept 1995  
**Site Name Historic** Primary Plutonium Storage Facility **Rev.** 14 May 1998  
**Common** \_\_\_\_\_  
**Field Recorder** M.S. Gerber  
**Owner's Name** U.S. Department of Energy, Richland Operations Office  
**Address** P.O. Box 550  
**City/State/Zip Code** Richland, WA 99352

### Status

- ☒ Survey/Inventory  
☐ National Register  
☐ State Register  
☐ Determined Eligible  
☐ Determined Not Eligible  
☐ Other (HABS, HAER, NHL)  
☐ Local Designation

### Photography

Hanford Photo Lab Neg. #  
95080369-15CN  
Photography Neg. No. HCRL Roll 372, Frames 19-24  
(Roll No. & Frame No.)  
View of All exterior facades  
Date August 1995; 6 August 1998

Photo at right: Roll 372, Frame 19  
View of north facade

**Classification** ☐ District ☐ Site ☒ Building ☐ Structure ☐ Object  
**District Status** ☒ NR ☐ SR ☐ LR ☐ INV  
**Contributing** ☒ **Non-Contributing** ☐  
**District/Thematic Nomination Name** Hanford Site Manhattan Project and Cold War Historic District

## Description Section

### Materials & Features/Structural Types

**Building Type** Industry  
**Plan** Rectangular  
**Structural System** Reinforced concrete  
**No. of Stories** One

### Roof Type

☐ Gable ☐ Hip  
☒ Flat ☐ Pyramidal  
☐ Monitor ☐ Other (specify) \_\_\_\_\_  
☐ Gambrel  
☐ Shed

### Roof Material

☐ Wood Shingle  
☐ Wood Shake  
☐ Composition  
☐ Slate  
☐ Tar/Built-up  
☐ Tile  
☐ Metal (specify) \_\_\_\_\_  
☒ Other (specify) Cast-in-place concrete slab  
☐ Not visible

### Foundation

☐ Log ☐ Concrete  
☐ Post & Pier ☐ Block  
☐ Stone ☒ Poured  
☐ Brick ☐ Other (specify) \_\_\_\_\_  
☐ Not visible

### Cladding (exterior Wall Surfaces)

- ☐ Log  
☐ Horizontal Wood Siding  
    ☐ Rustic/Drop  
    ☐ Clapboard  
☐ Wood Shingle  
☐ Board and Batten  
☐ Vertical Board  
☐ Asbestos/Asphalt  
☐ Brick  
☐ Stone  
☐ Stucco  
☐ Terra Cotta  
☒ Concrete/Concrete Block  
☐ Vinyl/Aluminum Siding  
☐ Metal (specify) \_\_\_\_\_  
☐ Other (specify) \_\_\_\_\_

### Integrity

(Include detailed description in  
**Description of Physical Appearance**)

	Intact	Slight	Moderate	Extensive
Changes to plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes to windows	<input type="checkbox"/> n/a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes to original cladding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes to interior	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) <u>Equipment</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

State of Washington, Department of Community Development  
Office of Archaeology and Historic Preservation  
111 21st Avenue Southwest, Post Office Box 48343  
Olympia, Washington 98504-8343 (206)753-4011

## LOCATION SECTION

**Address** 2736-Z Building, 200 West Area  
**City/Town/County/Zip Code** Richland/Benton County/99352  
**Twp** 12 N **Range** 25 E **Section** 1 **I/4 Section** SW **1/4 1/4 Sec** SE  
**Tax No./Parcel No.** \_\_\_\_\_ **Acreage** \_\_\_\_\_  
**Quadrangle or map name** Gable Butte, WA - 7.5 min. series  
**UTM References Zone** 11 **Easting** \_\_\_\_\_ **Northing** \_\_\_\_\_  
**Plat/Block/Lot** \_\_\_\_\_  
**Supplemental Map(s)** \_\_\_\_\_



### High Styles/Forms (Check one or more of the following)

- |   |   |
|---|---|
| <input type="checkbox"/> Greek Revival            | <input type="checkbox"/> Spanish Colonial Revival/Mediterranean |
| <input type="checkbox"/> Gothic Revival           | <input type="checkbox"/> Tudor Revival                          |
| <input type="checkbox"/> Italianate               | <input type="checkbox"/> Craftsman/Arts & Crafts                |
| <input type="checkbox"/> Second Empire            | <input type="checkbox"/> Bungalow                               |
| <input type="checkbox"/> Romanesque Revival       | <input type="checkbox"/> Prairie Style                          |
| <input type="checkbox"/> Stick Style              | <input type="checkbox"/> Art Deco/Art Moderne                   |
| <input type="checkbox"/> Queen Anne               | <input type="checkbox"/> Rustic Style                           |
| <input type="checkbox"/> Shingle Style            | <input type="checkbox"/> International Style                    |
| <input type="checkbox"/> Colonial Revival         | <input type="checkbox"/> Northwest Style                        |
| <input type="checkbox"/> Beaux Arts/Neoclassical  | <input type="checkbox"/> Commercial Vernacular                  |
| <input type="checkbox"/> Chicago/Commercial Style | <input type="checkbox"/> Residential Vernacular (see below)     |
| <input type="checkbox"/> American Foursquare      | <input checked="" type="checkbox"/> Other (specify)             |
| <input type="checkbox"/> Mission Revival          | <u>Industrial Vernacular</u>                                    |

### Vernacular House Types

- |   |  |
|---|--|
| <input type="checkbox"/> Gable Front          | <input type="checkbox"/> Cross Gable           |
| <input type="checkbox"/> Gable Front and Wing | <input type="checkbox"/> Pyramidal/Hipped      |
| <input type="checkbox"/> Side Gable           | <input type="checkbox"/> Other (specify) _____ |

## NARRATIVE SECTION

### Study Unit Themes (check one or more of the following)

☐ Agriculture  
☐ Architecture/Landscape Architecture  
☐ Arts  
☐ Commerce  
☐ Communications  
☐ Community Planning/Development

☐ Conservation  
☐ Education  
☐ Entertainment/Recreation  
☐ Ethnic Heritage (specify) \_\_\_\_\_  
☐ Health/Medicine  
☐ Manufacturing/Industry  
☐ Military

☐ Politics/Government/Law  
☐ Religion  
☐ Science & Engineering  
☐ Social Movements/Organizations  
☐ Transportation  
☒ Other (specify) Cold War Era  
☒ **Study Unit Sub-Theme(s)** Plutonium Finishing; Security

### Statement of Significance

Date of Construction 1970-71 Architect/Engineer/Builder Atlantic Richfield Hanford Company

☒ In the opinion of the surveyor, this property appears to meet the criteria of the National Register of Historic Places.

☒ In the opinion of the surveyor, this property is located in a potential historic district (National and/or local).

The 2736-Z Primary Plutonium Storage Facility was constructed during 1970-71 as the first building at the Hanford Site to be designed specifically for the storage and safe keeping of plutonium (Pu) products and scrap. Throughout the initial 27 years of Site plutonium production (1944-1971), Pu product and scrap material was stored in rooms, magazine storage facilities, military ammunition "igloos," and in various other quarters that had not been designed specifically for Pu storage. During the late 1960s, as a result of discussions concerning radiation safety and shielding questions, as well as fire safety and safeguards and security concerns, the recommendation to build a separate, new, concrete vault building within the Plutonium Finishing Plant complex was made at the Hanford Site. Construction of the "vault building," (the 2736-Z facility) was completed in early 1971. The principal feature of the facility was its four main rooms, known as vaults. Room 1 contained a limited amount of shelving, while Room 2 contained no shelving. These two rooms were placed in service as storage areas for Pu scrap and as staging areas. Rooms 3 and 4 were equipped with shielded cubicles, each with 28 pedestals, and were used to store Pu oxide and metal. A small annex building (2736-ZA) was also constructed to house the ventilation equipment needed to maintain pressure gradients and frequent air changes in the 2736-Z Building. (See continuation sheet)

### Description of Physical Appearance

The 2736-Z Building is a 65-foot long, 56-foot wide, 14-foot high, reinforced poured concrete rectangular facility just south of the 234-5Z Building. The exterior walls are eight inches thick, supported by cast-in-place concrete columns. The roof is a cast-in-place concrete slab, six and one half inches thick and contains vibration sensors. The building consists of four rooms for the storage of special nuclear material, divided by a corridor that runs the length of the building. Doors to the facility are in the center of the north and south walls. Each storage room is approximately 28 feet by 28 feet.

Originally, Rooms 3 and 4 were equipped with shielded cubicles constructed of pre-cast concrete panels eight inches thick. These rooms are still so equipped today. Each cubicle has a cross-sectional area one foot by two feet and is eight feet tall. There are 68 cubicles per room, all of which have pedestal storage rings for fixed array storage. The maximum number of storage rings per cubicle is 28 (14 rings for each of two pedestals), and each pedestal stores a single canister containing plutonium (Pu)(Figures 1 and 2). The storage rings are made of steel, and each is 12 inches from the storage ring above or nearest storage ring to each side. Each cubicle has two doors constructed of pre-cast concrete, eight inches thick at the thickest part. The doors, when closed, leave a gap of eight inches to allow for air circulation via natural convection. There also is a six-inch gap between the bottom of each door and the floor as a further aid to ventilation. Ventilation for these rooms is provided by supply and exhaust ducts mounted near the ceiling on the west and east walls, respectively.

Room 1 originally was equipped with a limited amount of steel shelving, but during 1978-79, it was equipped with cubicles. There are currently 68 cubicles in this room, constructed of pre-cast concrete panels eight inches thick. Like the cubicles in Rooms 3 and 4, each cubicle has a cross-sectional area one foot by two feet, and is eight feet tall. Sixty-six of the cubicles have pedestal storage rings for fixed array storage, and two have shelves so that shelves are made of steel. The fixed array cubicles have a maximum of 45 storage rings, nine for each of five pedestals. Each shelved-storage cubicle has 15 shelves. All cubicles in this room have two interlocking doors made of pre-cast concrete, eight inches thick. The doors of each cubicle are flush with the top of the cubicles and have a one half inch gap from the bottom of the doors to the floor. A ventilation duct, attached to the top of each cubicle, provides a continuous air flow through each cubicle. Thermocouples located in the top of each cubicle permit have been emplaced for air temperature monitoring. (See continuation sheet)

### Major Bibliographic References

Brecke, L.I. 1969. *General Criteria for the Storage of Plutonium*. ARH-1226. Atlantic Richfield Hanford Company, Richland, WA.

Elgert, O.J. 1968. *Appraisal of Plutonium Finishing Plant Operations*. CPD-336. U.S. Atomic Energy Commission, Richland, WA.

(See continuation sheet)

### **Statement of Significance** (Continuation Sheets, 2736-Z Building)

In 1972, largely because of the existence of the 2736-Z Building, as well as the Plutonium Reclamation Facility, the Hanford Site was designated as the Central Scrap Management Organization for the Atomic Energy Commission. The Central Scrap Management Organization mission gave the Hanford Site the responsibility for receiving, processing and providing safe interim storage for Pu scrap for the Atomic Energy Commission complex. The initial goal of the Organization was to process and reduce the “backlog scrap” of Pu to a six-month inventory (i.e., Pu scrap received within the previous six months), and to place this material into safe and secure storage within the 2736-Z Building. Processing involved turning “unstable” Pu scrap (scrap in solution, in mixed, and in other undesirable forms) into Pu oxide or metal. The Plutonium Reclamation Facility and the Plutonium Finishing Plant facilities were to be used to accomplish this stabilization.

During 1978-79, cubicles with both pedestal storage and shelving were built into Room 1, while cubicles and shelving were added to Room 2 of the 2736-Z Building. Some other physical changes also were made (see Description of Physical Appearance). During 1980-81, the 2736-ZB Support Facility was built adjacent to the 2736-Z Building in order to provide space and enclosed glove box equipment for assaying and re-packaging Pu-bearing materials, and to provide office space, change and locker rooms, and additional security protection for the 2736-Z vault rooms.

During 1984-87, the 2736-Z Building was upgraded with the installation of the Vault Safety and Inventory System, a state-of-the-heart detection, measurement, annunciation and alarm system for Pu inventory protection. By



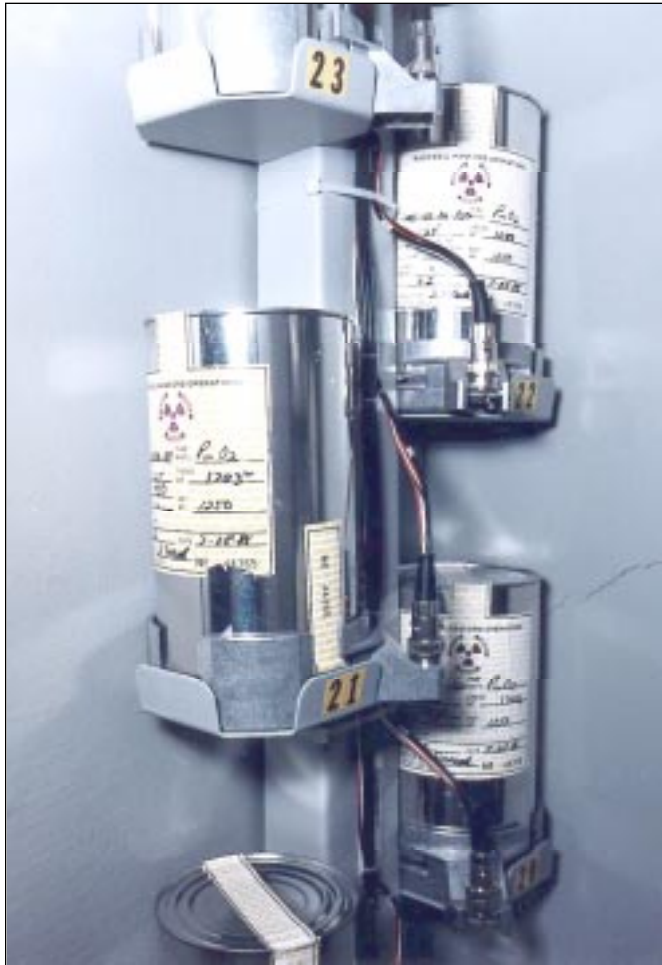
**Figure 1: Plutonium Storage Cubicle, 1972**  
(Neg. #72698)

the mid-1990s, the 2736-Z Building was holding several metric tons of stabilized plutonium, protected by this technology and other safeguard systems.

In July 1994, largely due to the capabilities of the Vault Safety and Inventory System equipment and to the physical integrity of the 2736-Z Building (along with the 2736-ZA and ZB Building), the Hanford Site was chosen to be part of an International Safeguards Program coordinated by the International Atomic Energy Agency. Beginning in December 1994, part of the Pu inventory in the 2736-Z Facility was placed under the Agency's control in the first inventory visit by Agency inspectors.

The activities and missions carried out in and because of the 2736-Z Primary Plutonium Storage Facility are associated with events that are significant in American history. Foremost, the decision to construct the 2736-Z vaults represented a growing awareness of and concern with, safety and environmental issues at the Hanford Site and in the national nuclear defense complex in the late 1960s and early 1970s. Such environmental concerns are a major theme in Hanford Site and U.S. History for that era. Further, the scrap management mission that came to the Hanford Site largely due to the existence of the 2736-Z Facility resulted in larger and more diverse inventories of Pu scrap and stabilized Pu that was transferred to Washington State than would have been in the region were it not for these vaults. The resulting safety and environmental concerns and the programs established to address such issues would not have existed had Hanford processed and stored only its own Pu materials. Therefore, the Cold War waste legacy that resides at the Hanford Site has connections to the nation's atomic energy complex.

In turn, the presence of the Pu inventory in the 2736-Z Building justified the funding for the emplacement of the Vault Safety and Inventory System technology, which then attracted an international mission. The International Atomic Energy Agency involvement with the Hanford Site represents a milestone in American and world-wide attempts to deal with the legacy of the Cold War. It is therefore the conclusion of the U.S. Department of Energy that Building 2736-Z is eligible for inclusion in the National Register of Historic Places under Criterion A as a contributing property within the Hanford Site Manhattan Project and Cold War Era Historic District.



**Figure 2: Pedestal Storage Rings, 1986**  
(Neg. #8605801)

#### **Description of Physical Appearance (Continued)**

Room 2 originally contained no cubicles or shelving, but steel shelves were added during 1978-79. Currently there is shelf storage space in this room for 700 items of special nuclear material. Each cubicle in the room measures nine inches by nine inches, by 12 inches deep. Containers are maintained on the shelves by means of a spacing-loaded wire on the front (to load and unload) and a two-inch lip at the bottom of each shelf. Additionally, there are about 588 square feet of open floor space in this room for the storage of fissile material in shipping and storage container arrays up to the limit allowed by criticality prevention specifications. Ventilation for Room 2 is provided by supply and exhaust ducts mounted near the ceiling on the east and west walls, respectively.

During 1984-87, Rooms 1, 3, and 4 of the 2736-Z facility were equipped with a Vault Inventory and Safety System. This system has components that some of which cannot be described due to security and non-proliferation concerns. Rooms 1, 3, and 4 have a combined storage capacity of 6,868 canister monitoring units (CMUs). Attached to the bottom of each canister is a label that is specially designed to provide electronic capacitance identification data, as each canister has a unique electron signature. This label is capacitively coupled to the canister monitoring unit. Specifically, label identification, canister bulge, canister temperature, presence and ambient air temperature next to the canister are the data read by the Vault Inventory and Safety System equipment. Canister bulge data is gathered by a pressure switch, another pressure switch confirms canister presence, and two thermistors gather

temperature data both for the canister and for the air next to the canister. Data processing equipment provide the data logging and processing of information received from the container monitors.

### **Major Bibliographical References (Continued)**

Erickson, T.L. 1986. *Operability Test: Project B-339, Vault Safety and Inventory System*. SD-CP-OTP-101. Rockwell Hanford Operations, Richland, WA.

Felt, R.E. and J.L. Kemp. 1971. *Acceptance of Competed Project: Plutonium Storage Vault, Z-Plant*. Atlantic Richfield Hanford Company, Richland, WA.

Felt, R.E. 1972. *Criticality Safety Report: Storage of Plutonium in the 2736-Z Building*. ARH-1964 Rev. Atlantic Richfield Hanford Company, Richland, WA.

Felt R.E. 1972. *Plutonium Scrap Management Plan*. ARH-2618 DEL. Atlantic Richfield Hanford, Richland, WA.

Finch, L.W. 1973. *Request for Directive Revision: Modifications to 2736-Z Plutonium Storage Vault (Project HCP-676)*. ARH-2621, Rev. 1. Atlantic Richfield Hanford Company, Richland, WA.

Hanford Engineering Services. 1970. *Specifications for Plutonium Storage Vault, Building 2736-Z, Project HAP-642*. HWS-8937. Vitro Corporation of America, Richland, WA.

Kemp, J.L. 1969. *Design Criteria, Plutonium Storage Vault, Z Plant*. ARH-1298. Atlantic Richfield Hanford Company, Richland, WA.

Lee, H.A. 1978. Design Report - Additional Plutonium Storage 2736-Z Building, Rooms 1 and 2. RHO-CD-377. Rockwell Hanford Operations, Richland, WA.

Lyneis, C.A. 1969. *Chemical Processing Division, Major Program Issue: Storage of Plutonium Products and Scrap*. ARH-1490 DEL. Atlantic Richfield Hanford Company, Richland, WA.

McDonald, D. 1971. *Plutonium Finishing Twelve-Month Operating Plan, October 1, 1971 through September 30, 1972*. ARH-2245 DEL. Atlantic Richfield Hanford Company, Richland, WA.

McRae, L.P. and D.E. Six. 1991. *Operating Experience: A First Generation Integrated Safeguards System*. WHC-SA-1129. Westinghouse Hanford Company, Richland, WA.

Raile, M.N. 1976. *Conceptual Design Plan, Plutonium Storage Facility*. ARH-CD-791. Atlantic Richfield Hanford Company, Richland, WA.

U.S. Atomic Energy Commission. 1971. *Plutonium Product Storage*. CPD-390. U.S. Atomic Energy Commission, Richland, WA.

Vitro Engineering Corp. 1980. *Title I Design Report: 2736-Z Support Facility Project B-246*. VITRO-R-642. Vitro Engineering Corp., Richland, WA.

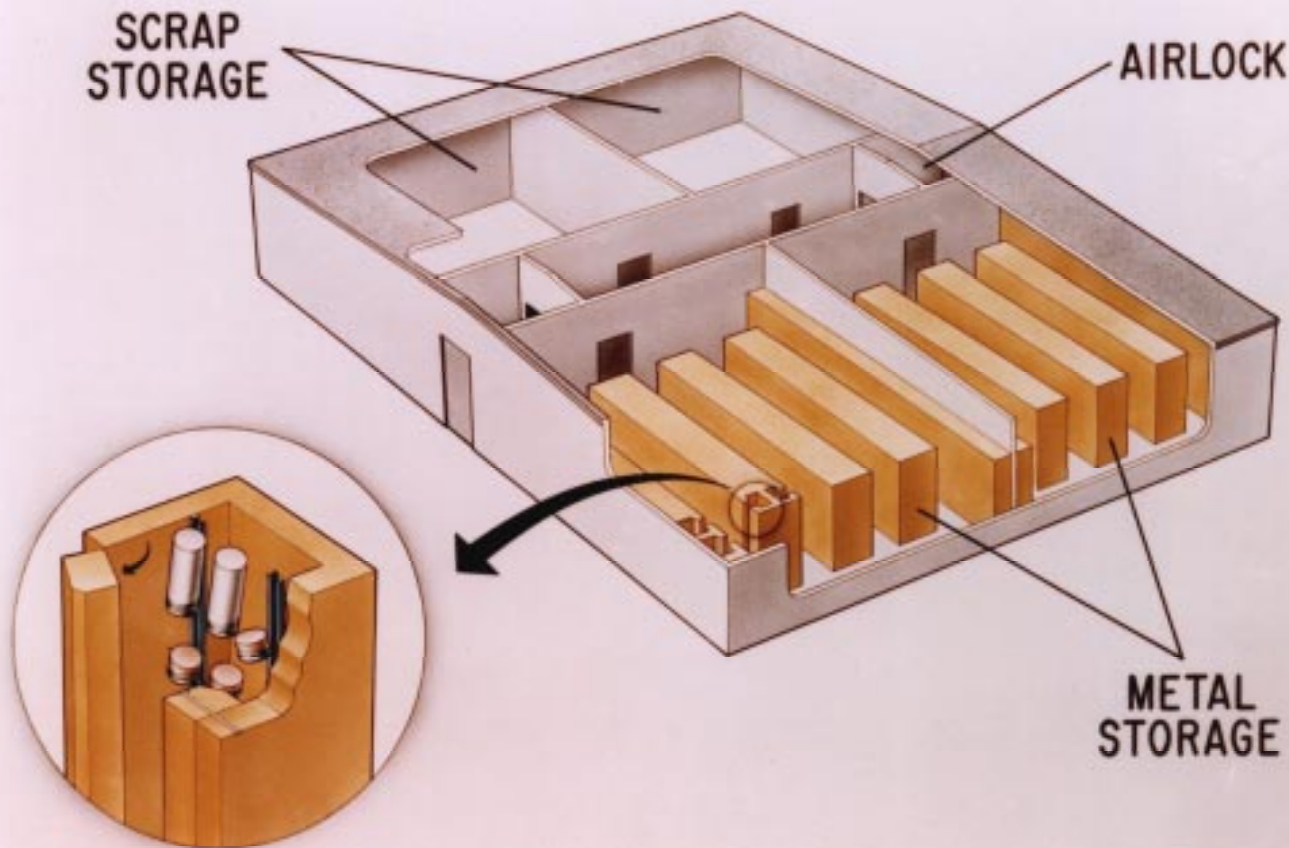
Vogt, E.C. 1982. *Safety Analysis Report: Plutonium Handling and Storage, 2736-Z Support Complex*. RHO-CD-1465. Rockwell Hanford Operations, Richland, WA.

Westinghouse Hanford Co. 1995. *Plutonium Finishing Plant Final Safety Analysis Report*. WHC-SD-CP-SAR-021. Westinghouse Hanford Company, Richland, WA.

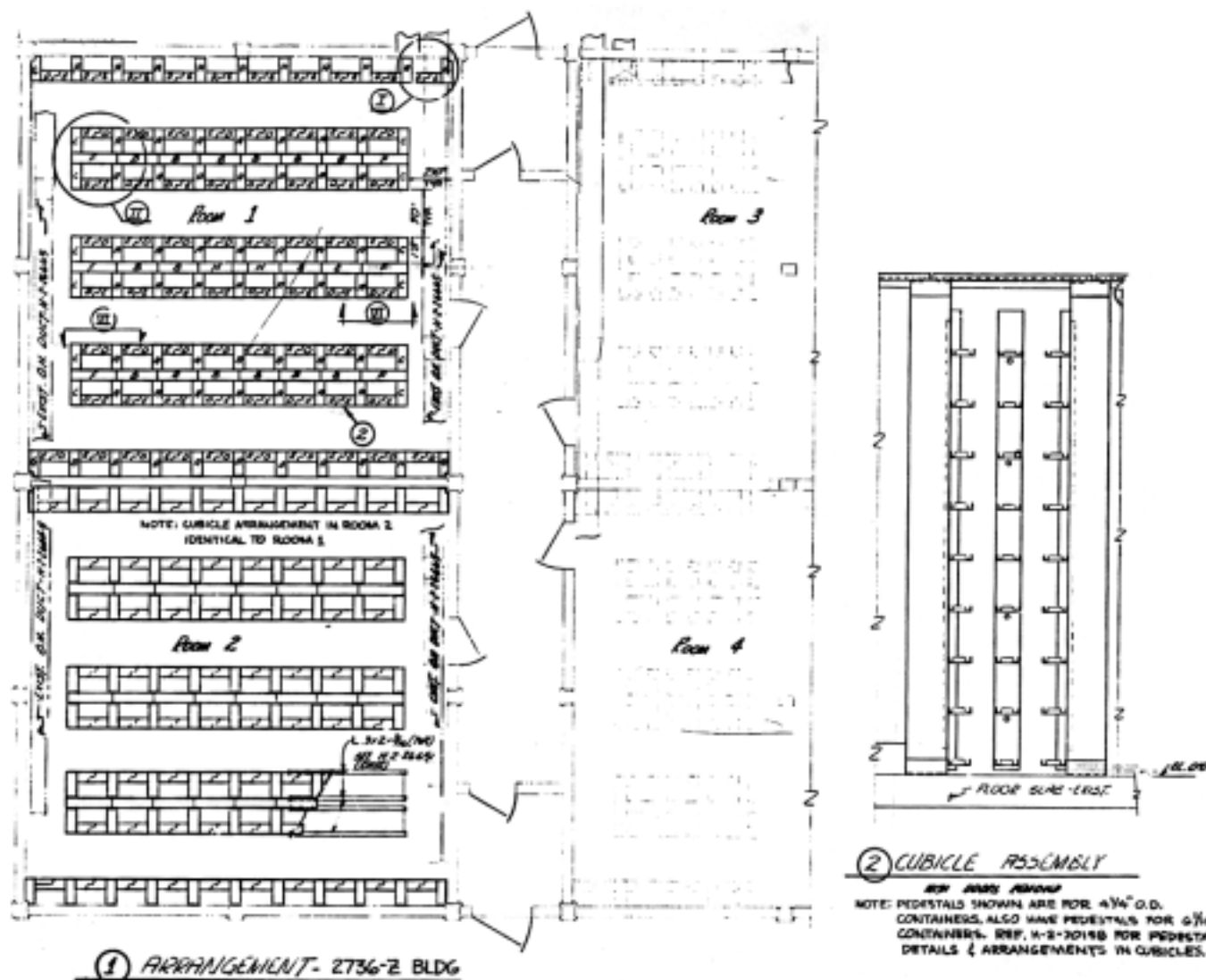
Wodrich, D.D. 1974. *Physical Completion Notice, Modifications to 2736-Z Plutonium Storage Vault*. Atlantic Richfield Hanford Company, Richland, WA.



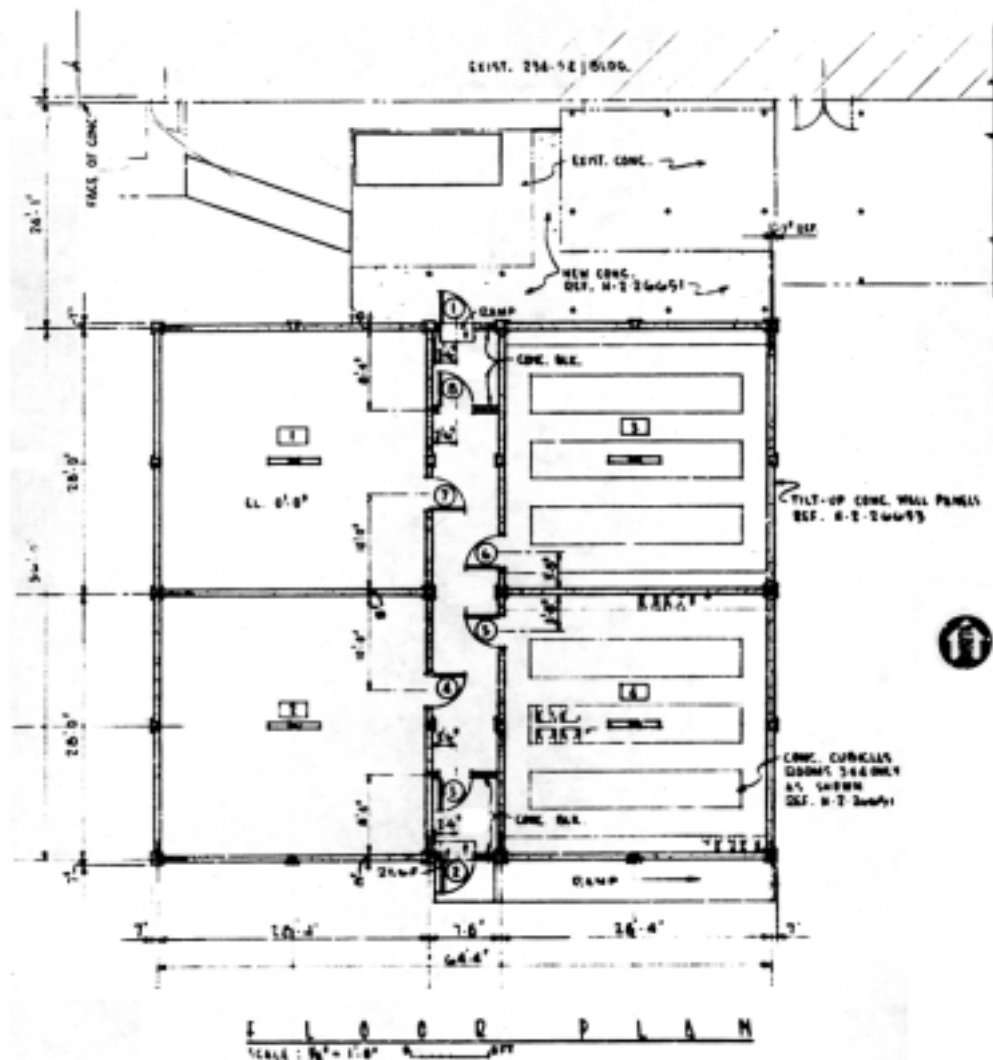
# ***PLUTONIUM STORAGE VAULT***



Cutaway illustration of the 2736-Z Building, 1971-1978 (Neg. #77641)



Drawing No. H-2-70010: Cubicle installation in the 2736-Z Building, 1976



Drawing No. H-2-26648: 2736-Z Building floor plan, 1970